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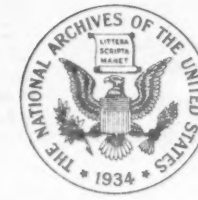

ENVIRONMENTAL PROTECTION AGENCY

PETROLEUM LIQUID STORAGE VESSELS

Proposed Standards and Notice of Hearing

[6560-01]

ENVIRONMENTAL PROTECTION AGENCY

[40 CFR Part 60]

[FRL 870-5]

STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

Storage Vessels for Petroleum Liquids

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule.

SUMMARY: The proposed standards would limit emissions of hydrocarbons from new, modified, and reconstructed petroleum liquid storage vessels with a capacity greater than 151,416 liters (40,000 gallons). The standards implement the Clean Air Act and are based on a review of the current standards of performance which indicated that the technology for storage vessels has imporved and it is appropriate to revise the standards. The current standards for storage vessels require a single seal to close the space between the roof edge and tank wall on external and internal floating roof tanks. The intended effect of the proposed standard is to require double seals on external floating roof tanks for which construction is commenced after (date of proposal of the standards).

DATES: Comments must be received on or before June 19, 1978. A public hearing will be held on June 7, 1978; a notice is published elsewhere in this FEDERAL REGISTER regarding the time and place the hearing will be held.

ADDRESSES: Comments should be submitted to the Emission Standards and Engineering Division (MD-13), Environmental Protection Agency, Research Triangle Park, N.C. 27711, Attention: Mr. Jack R. Farmer. Public comments received and other documents used in the development of the proposed standards comprise the docket required by section 307(d) of the Clean Air Act. Included in the docket is the economic impact assessment of the proposed standards entitled "Financial and Economic Impacts of Proposed Standards of Performance for New Sources—Storage Vessels for Petroleum Liquids." The docket, numbered OAQPS-78-2, is available for public inspection and copying at the Public Information Reference Unit, Room 2922, 401 M Street SW., Washington, D.C. 20460.

FOR FURTHER INFORMATION CONTACT:

Mr. Don R. Goodwin, Director, Emission Standards and Engineering Division (MD-13), Environmental Protection Agency, Research Triangle Park, N.C. 27711, telephone number 919-541-5271.

SUPPLEMENTARY INFORMATION:

SUMMARY OF PROPOSED STANDARDS AND IMPACTS

The proposed standards of performance would apply to storage vessels which have a capacity greater than 151,416 liters (40,000 gallons) and which are constructed after (proposal date of these standards). The proposed standards differ from the current standards in that they contain more stringent requirements for storage vessels which have external floating roofs or internal-floating-type covers. The current standards require that storage vessels containing a petroleum liquid with a true vapor pressure equal to or greater than 78 mm Hg (1.5 psia) but not greater than 570 mm Hg (11.1 psia) be equipped with a floating roof, a vapor recovery system, or equivalent. Storage vessels containing petroleum liquids with a true vapor pressure greater than 570 mm Hg (11.1 psia) are to be equipped with a vapor recovey system or its equivalent. The current standards remain in effect for those affected facilities which began construction, modification, or reconstruction after the applicable date of the current standards (March 8, 1974, for vessels with capacities between 40,000 and 65,000 gallons and June 11, 1973, for vessels with greater than 65,000 gallon capacity) and before (date of proposal of these standards). Retrofit of such facilities would not be required by the proposed standards.

The proposed standards would require the use of double seals on external floating roof storage vessels. The primary seal would have to be a metallic shoe seal or equivalent with a seal fabric having no holes, tears, or other openings. Gaps between the tank wall and the primary seal could not exceed 0.32 cm (⅛ in.) in width for a cumulative length of 60 percent of the circumference of the tank, 1.3 cm (½ in.) in width for a cumulative length of 30 percent of the circumference of the tank, and 3.8 cm (1½ in.) in width for a cumulative length of 10 percent of the circumference of the tank. The secondary seal would be required to completely cover the space between the roof edge and the tank wall. Gaps between the tank wall and the secondary seal could not exceed 0.32 cm (⅛ in.) in width for a cumulative length of 95 percent of the circumference of the tank, and 1.3 cm (½ in.) in width for a cumulative length of 5 percent of the circumference of the tank.

The proposal also specifies that the Administrator approves as equivalent technology the use of a nonmetallic resilient seal as the primary seal provided that the gaps between the tank wall and the primary seal do not exceed 0.32 cm (⅛ in.) in width for a cumulative length of 95 percent of the circumference of the tank and do not exceed 1.3 cm (½ in.) in width for a cumulative length of the remaining 5 percent of the circumference of the tank, and the gaps between the tank wall and the secondary seal used above the nonmetallic resilient seal do not exceed 0.32 cm (⅛ in.) in width over the entire circumference of the tank.

Since the current standards already require at least single seals on floating roof tanks, the maximum cost of the proposed standards would be the incremental cost of using a shoe seal instead of a nonmetallic resilient seal as the primary seal and of installing a second seal. These two costs are estimated to increase the cost of a new 61-meter (200-foot) diameter storage vessel by about 0.9 to 1.9 percent.

The proposed standards would have a positive impact on environmental quality. The estimated emission reduction attributed to the current standards is 80 percent. The proposed standards would further reduce emissions from a new storage vessel containing a petroleum liquid by about 75 percent. The total emission reduction, therefore, would be about 95 percent. The proposed standards would have no adverse environmental or energy impacts.

BACKGROUND

On March 8, 1974, under the authority of section 111 of the Clean Air Act, EPA promulgated standards of performance in Subpart K of 40 CFR Part 60 for hydrocarbon emissions from petroleum liquid storage vessels with a capacity greater than 151,416 liters (40,000 gallons). These standards require that new storage vessels containing petroleum liquids with a true vapor pressure greater than 570 mm Hg (11.1 psia) be equipped with a vapor recovery system or its equivalent. For petroleum liquids with a true vapor pressure equal to or greater than 78 mm Hg (1.5 psia) but not greater than 570 mm Hg (11.1 psia), new storage vessels are required to be equipped with a floating roof (internal or external), a vapor recovery system, or equivalent. The primary intent of Subpart K was to prohibit the use of fixed roofs on new storage vessels. A floating roof or vapor recovery system has the potential for reducing emissions by 70 to 90 percent more than the reduction achieved with a fixed roof only.

An external floating roof tank consists of a welded or riveted cylindrical vessel equipped with a deck or roof which floats on the liquid surface and rises and falls with the liquid level in the tank. The liquid surface is completely covered by the roof except for the space between the roof and the wall. The current standards require that a sliding seal be attached to the roof to close the space between the roof edge and the tank wall. The seals

in current use are metallic shoe seals or nonmetallic resilient seals (see Figures 1 and 2). For a storage vessel equipped to meet the current standards, emissions are primarily due to wind-induced hydrocarbon losses through the seal system. Seal losses increase if there is an improper fit between the seal and the tank wall or leakage through the fabric cover that is used to bridge the space between a shoe seal and the floating roof.

Although good maintenance and inspection programs may be effective in reducing emissions through a single seal, recent industry tests have indicated that reductions can be achieved by installing a second seal over the primary seal (see Figure 3). As improved technology is developed, section 111(b)(1)(B) of the Clean Air Act provides for revision of standards of performance. Since the promulgation of the current standards, the use of double seals on external floating roof tanks has been demonstrated and has been shown to significantly reduce emissions. The intent of the proposed standards is to require the use of double seals instead of single seals on external floating roof petroleum liquid storage vessels for which construction is commenced on or after (date of proposal of these standards).

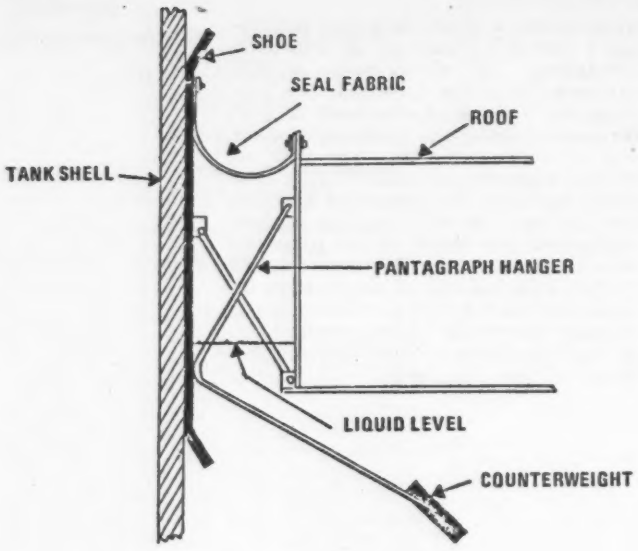

Figure 1. Primary metallic shoe seal

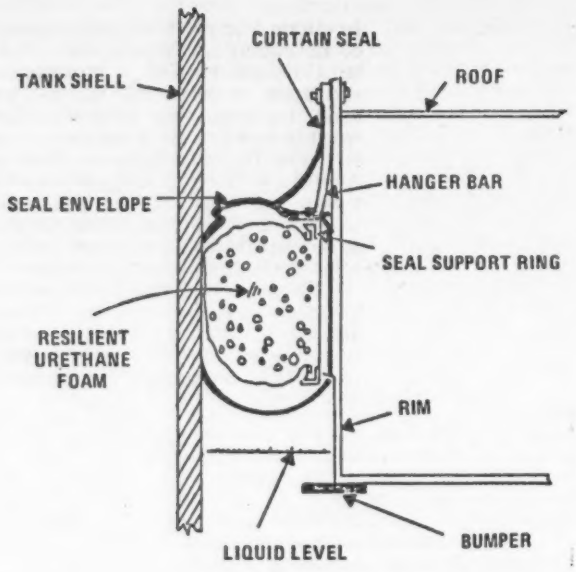

Figure 2. Primary nonmetallic resilient seal

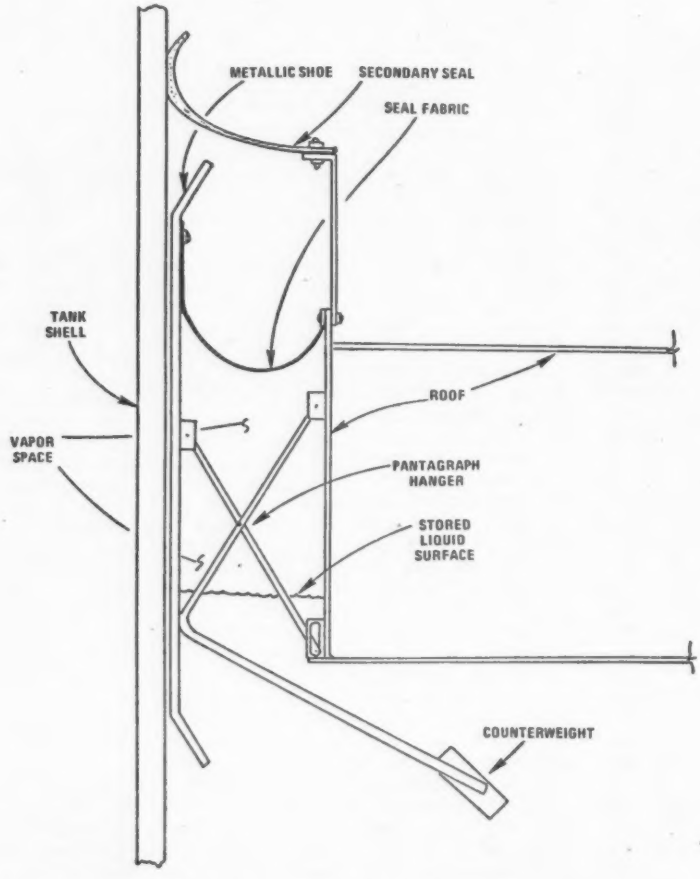

Figure 3. Metallic-shoe-type seal with secondary seal

The proposed standards are in terms of equipment specifications and maintenance requirements rather than mass emission rates. It is extremely difficult to quantify mass emission rates for petroleum liquid storage vessels because of the varying loss mechanisms and the number of variables affecting loss rate. Section 111(h)(1) of the Act provides that equipment standards may be established for a source category if it is not feasible to prescribe or enforce a standard which specifies an emission limitation. It also requires that an equipment standard include requirements to insure the proper operation and maintenance of the equipment. Therefore, the proposed standards contain certain monitoring requirements.

RATIONALE FOR PROPOSED STANDARDS

SELECTION OF THE SOURCE CATEGORY AND AFFECTED FACILITY

Section 111 of the Act directs the Administrator to establish standards of performance for new and modified stationary sources that may contribute significantly to air pollution which causes or contributes to the endangerment of public health or welfare. EPA considers petroleum liquid storage vessels to be significant contributors to air pollution. Based on emission factors (*1, 2*) derived from equations in American Petroleum Institute Bulletins, current nationwide hydrocarbon emissions from petroleum liquid storage tanks are estimated to be about 750 Gg (or about 850,000 tons) per year. This represents about 4.5 percent of the estimated 1975 national hydrocarbon emissions from stationary sources. (*3*)

In a 1976 study of the petroleum refining industry,(*4*) EPA estimated that the growth rate of domestic petroleum demand would be about 2½ percent annually for the period 1974 to 1985. It is assumed that the growth rate of petroleum liquid storage tanks would be the same. Although this estimated growth rate is subject to change depending on the world energy situation and the nation's energy policy, growth in the construction of new petroleum liquid storage tanks is likely to continue at about this rate at least into the near future. All new petroleum storage tanks will be required by EPA's current standards of performance to have floating roofs, vapor recovery systems, or equivalent. Because petroleum liquid storage vessels are significant contributors to air pollution and it has been demonstrated that emissions from these vessels which are equipped with external floating roofs in compliance with the current standards can be reduced further by installation of double seals, petroleum liquid storage vessels have been selected for additional regulation. Petroleum liquid storage vessels for which construction was commenced before (date of proposal of these standards) are still subject to the existing standards of performance and those storage vessels equipped with external floating roofs are required to have single seals only.

SELECTION OF BEST TECHNOLOGY CONSIDERING COSTS

Measurement of emissions to the atmosphere from commercial size petroleum liquid storage vessels with external floating roofs using conventional measurement techniques is virtually impossible because the emissions are not confined. The proposed standards, therefore, are based primarily on studies conducted recently by Chicago Bridge and Iron (CBI) for Standard Oil of Ohio and Western Oil and Gas Association (*5*), (*6*), (*7*), (*10*), (*11*) on a 6-meter (20-foot) diameter test tank which was enclosed for the purpose of emission measurement. During the CBI studies, pressure drop measurements were made around the circumference of the tank on the windward and leeward sides. Emissions were measured under a variety of conditions to determine the impact of such factors as wind speed, the use of double seals, gap size between the seals and tank wall, shoe seal tightness, rim temperatures, and product vapor pressure on emission levels.

It was found that most hydrocarbon emission from storage vessels are due to wind-induced pressure losses. Relative to reference atmospheric pressure, pressure variations occur around the edges of the roof of a tank as a function of wind velocity and position of the roof. With respect to wind direction, the pressure is higher on the leeward side than on the windward side of the tank. The pressure differences on a tank roof are such that fresh air flows downward through the space between the tank wall and the seal on the leeward side, across the liquid surface along the circumference of the tank, and out the other side. The spaces are saturated with hydrocarbon vapors, which are carried out in the flow of air. The true vapor pressure of the liquid being stored, which determines the hydrocarbon concentration in the spaces between the seal and tank wall and the roof and liquid surface, and the type and condition of seals are other factors which were found to significantly influence emissions.

Figure 4 shows the effect of various types of seals and seal conditions on emission levels. The other two factors which were found to have the most impact on emissions—wind velocity and vapor pressure of the stored liquid—are held constant. Emission levels would deviate from those shown in the figure if one of these conditions were changed. As indicated in Figure 4, for both nonmetallic resilient seals and shoe seals, using a secondary seal above the primary seal and reducing the gaps between both the primary and the secondary seals and the tank wall significantly reduce the emissions resulting from wind-induced pressure losses. Using double seals reduces the impact of the size of the gap between the primary seal and the tank wall on emission levels, but reducing these gaps still has a positive effect.

The CBI test data in Figure 4 also indicate that when a nometallic resilkient seal is used as the primary seal and the secondary seal has a 1.3 cm (½ in.) gap for 5 percent of the circumference of the vessel, emissions are 5 times higher than when a shoe seal is used as the primary seal and the secondary seal has the same gaps. Based on these data, it is concluded that the use of a shoe seal achieves a greater reduction in emissions than the use of a nonmetallic resilient seal.

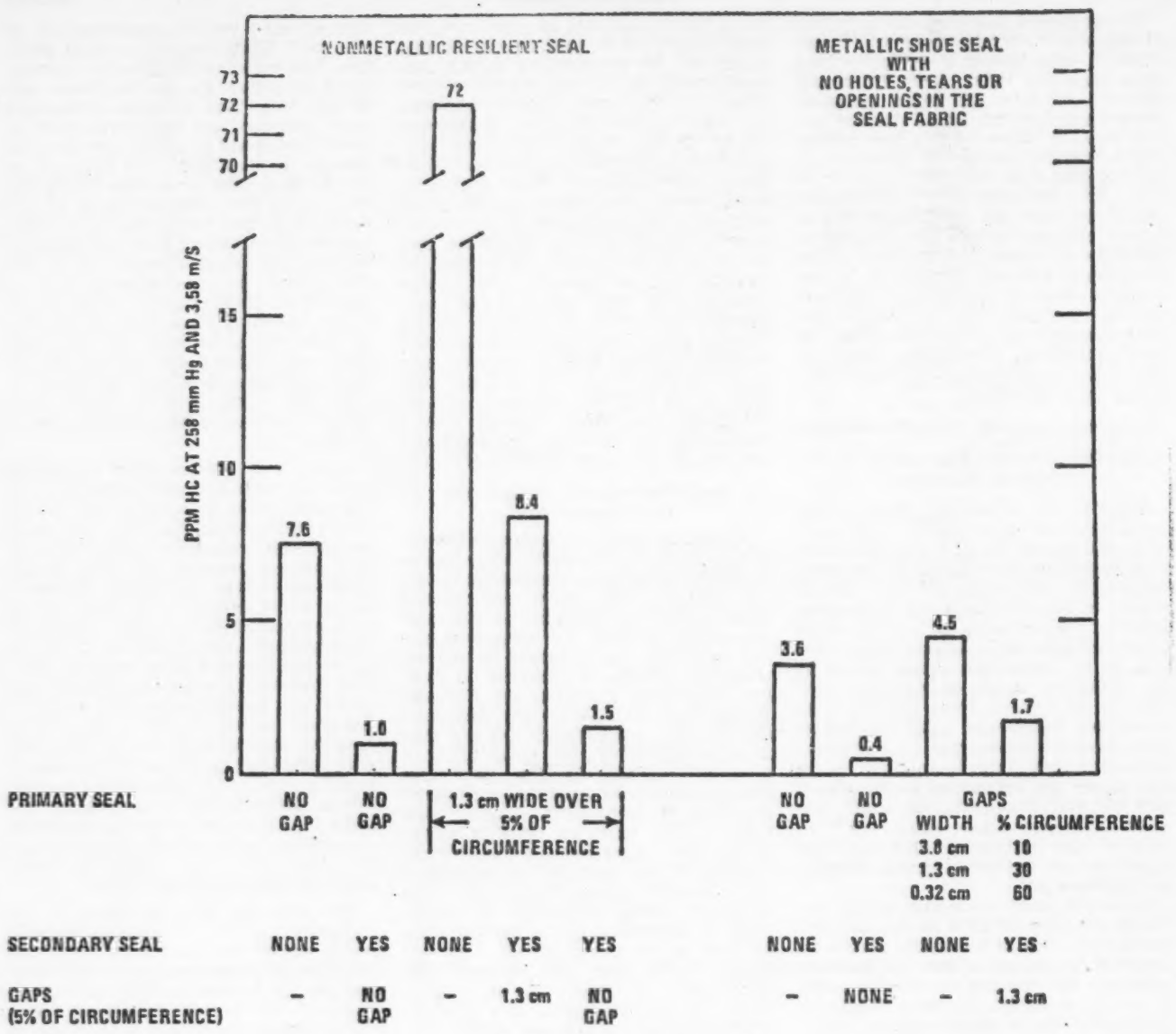

Figure 4. Emissions from CBI test tank with various seals.

It can also be seen in Figure 4 that a primary metallic shoe seal with no gap used in conjunction with a secondary seal with no gap achieves the lowest emission level. However, it is difficult to comply with a no gap requirement becuase in most cases the storage vessels are not perfectly round. A more viable regulatory approach would be to allow some small gaps between the seals and tank wall. From Figure 4 it can be seen that even with small gaps, the hydrocarbon emission level remains low. Consequently, the proposed standards contain certain gap requirements for both the primary and secondary seals.

For a shoe seal used as the primary seal, the permeability of the seal fabric used to bridge the space between the shoe seal and the floating roof can be an important factor affecting emission levels. The use of fabric with holes, tears, or openings increases leakage due to gas penetration through the fabric. Therefore, it is concluded that requiring the use of a metallic shoe seal with no holes, tears, or openings would result in reduced hydrocarbon emissions.

Costs must be considered in setting standards of performance under section 111. Since the current standards already require single seals on floating roof storage vessels the costs associated with the proposed standards are only the incremental costs of using a metallic shoe seal instead of a nonmetallic resilient seal as the primary seal and the costs of adding a secondary seal. For a new 61-meter (200-foot) diameter storage vessel, the total installed cost of a nonmetallic resilient seal is estimated to be approximately $20,000 to $33,000, and the total installed cost of a shoe seal is estimated to range from $28,000 to $41,000, or approximately $8,000 more than a nonmetallic resilient seal. The total annualized cost for a shoe seal is estimated to be about $2,400 more than that for a nonmetallic resilient seal. EPA is not aware of any situations where technological or economic considerations would preclude the installation of shoe seals in lieu of nonmetallic resilient seals during the construction of new petroleum storage vessels.

Adding a secondary seal is estimated to cost $12,600 to $19,000, and to increase total annualized costs by $4,000 to $5,800 if it is assumed that there are no savings due to retention of petroleum product. Total annualized costs would be reduced to between $1,700 and $5,400, however, if a savings in petroleum product is assumed. A range is estimated because the amount of petroleum product saved would depend on the true vapor pressure of the petroleum liquid and wind velocity.

The cost of a new 61-meter diameter storage vessel is estimated to be about $1,400,000 to $2,200,000. This cost includes the tank foundation, firewalls, connections to refinery pumps, lines, etc. Thus, using a shoe seal instead of a nonmetallic resilient seal as the primary seal and installing a secondary seal would increase the cost of a new storage vessel by only about 0.9 to 1.9 percent. By comparison, the increased cost for a new storage vessel to comply with the current standards is 12 to 25 percent. Therefore, the increased cost of complying with the proposed standards is considered to be reasonable and would not adversely affect the demand for new vessels. Since the additional cost would not reduce the demand for new vessels, the economic impact of the proposed standard on the manufacturers of storage vessels is small.

EPA also attempted to determine the impact of the proposed standards on nonmetallic resilient seal manufacturers; however, it was discovered that the materials for the seals are purchased by the storage vessel manufacturers who then fabricate and install the seals. Nearly all the storage vessel manufacturers have the expertise to install either metallic shoe seals or nonmetallic resilient seals with most manufacturers being indifferent to customer preference toward a certain type of seal. One manufacturer does stress its expertise with nonmetallic resilient seals; however, this emphasis has not caused disproportional sales of nonmetallic resilient seals over metallic shoe seals. Also, since the seals are fabricated on site, little or no extra capital would be needed to convert plant and equipment to produce a greater quantity of metallic shoe seals. In addition, storage vessel manufacturers generally do not maintain an inventory of nonmetallic resilient seal materials that would need to be liquidated.(12) Consequently, any shift towards more installation of metallic shoe seals caused by the proposed standards would have little impact on the storage vessel manufacturers.

Three companies in the United States currently supply the rubber casings and urethane foam necessary for the fabrication of the nonmetallic resilient seals. All three of these companies are highly diversified and the sale of nonmetallic resilient seal materials makes up only a small portion of their total sales. The average losses in sales of the three companies due to the proposed standard would range from about 0.5 to 1.4 percent of total sales.(12) Consequently, the economic impact on the nonmetallic resilient seal materials suppliers would be small.

Any difference in maintenance requirements for metallic shoe seals as compared with maintenance requirements for nonmetallic resilient seals could also impact the storage vessel purchasers. Generally, however, metallic shoe seals last longer and require less maintenance than nonmetallic resilient seals. (*12*) Therefore, this aspect of the proposed standards would have no adverse impact on the storage vessel purchasers.

The longer life of the average metallic shoe seal would also impact the vessel service companies. However, since replacing seals is only a small part of a vessel service company's business, the economic impact of the proposed standard would be small.

There is expected to be little, if any, economic impact on existing storage vessels as a result of modifications of existing vessels. The only change EPA is presently aware of which could potentially be considered a modification is a change in the petroleum liquid being stored. However, 40 CFR 60.14(e)(4) states that a change in fuel or raw material is not considered to be a modification if the existing facility was designed to accommodate that alternative use prior to the promulgation of standards of performance for that source type. There are likely to be few, if any, changes in the product being stored which a storage vessel was not originally designed to accommodate.

Using the emission control technology described in the preceding paragraphs—double seals; shoe seals as the primary seals; seal fabric with no holes, tears, or openings and narrow gap widths—would have a beneficial impact on environmental quality. Compared with the current standards, this technology would reduce hydrocarbon emissions from petroleum liquid storage vessels equipped with external floating roofs by 60 percent assuming a metallic shoe seal was used to meet the current standard, and up to 98 percent assuming a nonmetallic resilient seal was used to meet the current standard. These figures are based on Figure 4 and the assumption that the storage vessel is exposed to a wind velocity of 3.58 m/s (8 mph) and contains a petroleum liquid with a true vapor pressure of 258 mm Hg (5 psia). The percentage reduction would be expected to vary for different storage vessels depending on the wind speed and the true vapor pressure of the petroleum liquid being stored. There would be no adverse impacts on other environmental media. National energy requirements would actually be decreased very slightly since this technology would result in retention of petroleum products that would otherwise be lost as hydrocarbon emissions.

Consequently, the use of double seals employing a shoe seal with a seal fabric with no holes, tears, or openings as the primary seal, and having narrow gaps between both the primary and secondary seals and the storage vessel wall, has been selected as the best demonstrated technology, consid-

ering costs, for reducing emissions from petroleum liquid storage vessels. Thus, the proposed standards require either the use of this technology or technology demonstrated to be equivalent.

As can be observed in Figure 4, if a nonmetallic resilient seal is used as the primary seal and there are no gaps (i.e., gap widths of 0.32 cm or less) between the secondary seal and the storage vessel wall, emissions are approximately the same as when a shoe seal is used as the primary seal and the gaps on the secondary seal are as much as 1.3 cm (½ in.) for 5 percent of the circumference of the tank. The proposed regulation, therefore, states that the Administrator approves the use of a nonmetallic resilient seal as equivalent to a shoe seal for the primary seal if the secondary seal above the nonmetallic resilient seal has gaps no greater than 0.32 cm.

Instead of approving as equivalent technology the use of nonmetallic resilient seals in conjunction with secondary seals with no gaps greater than 0.32 cm, the standards of performance could require either the use of shoe seals or the use of nonmetallic resilient seals with the more stringent gap requirement for nonmetallic resilient seals. If the standard were written in this way, nonmetallic resilient seals would always be required to meet the more stringent gap requirement. It is possible, however, that improvements can be made to nonmetallic resilient seals to make them equivalent to metallic shoe seals without meeting a more stringent gap requirement. It is also possible that other seals can be developed that would be equivalent to metallic shoe seals. The proposed standards, therefore, provide maximum flexibility for manufacturers to make improvements in nonmetallic resilient seals or other types of seals and demonstrate their equivalency to metallic shoe seals.

SELECTION OF MISCELLANEOUS REQUIREMENTS

The current standards of performance do not apply to storage vessels for petroleum or condensate stored, processed, and/or treated at a drilling and production facility prior to custody transfer. These vessels were exempted because many of them are normally bolted for purposes of mobility. The proposed standards of performance, however, would apply to storage vessels at drilling and production facilities if the vessels are larger than 151,416 liters (40,000 gallons). Bolted vessels larger than the cut-off size would not be exempt because they are no different from other large storage vessels being covered with regard to emissions, control technology, or costs.

The definition of "petroleum refinery" has been expanded in both Subparts K and Ka to include extracting. This change is being made to ensure that the definition covers all activities at a petroleum refinery. "Extracting" was not purposely excluded in Subpart K and its addition should not change the impact of the standard.

SELECTION OF TESTING, MONITORING, AND RECORDKEEPING REQUIREMENTS

The proposed standards include a section on testing (section 60.114a) for determining compliance with the gap requirements. The current standards of performance do not have a comparable testing section because they do not contain gap requirements. Performance tests for most sources subject to Part 60 are required within 60 days after achieving the maximum production rate. The maximum production rate for a storage vessel would be the filling of the vessel with petroleum liquid. The proposed standards for storage vessels provide the option of doing the performance test before a tank is filled with petroleum liquid. This is based on the reasoning that the gaps between a primary seal and the tank wall have to be measured when the secondary seal is not in place when doing a performance test. This means that the tank could not contain petroleum liquid, since the secondary seal is required by the standard to cover the primary seal when the tank is in operation. The gaps for the primary seal would be most easily measured during the construction of the tank before the secondary seal is installed. If the owner or operator chose to do the measurements on the primary seal after the tank has been filled with petroleum liquid, it would be necessary to empty the tank and remove the secondary seal. The secondary seal gaps, on the other hand, could be measured when the tank is filled with petroleum liquid. The proposed standards would require that this performance test be repeated every five years.

The proposed standards would require that the distance between the seals and the tank wall be measured while the floating roof is placed at different levels. This could be done by putting different quantities of water into the tank before the tank is filled with petroleum liquid. Measuring the gaps at different levels is required because the floating roof would be located at different levels while the tank is in normal operation. The proposed standards would also require that the gaps be measured around the circumference of the tank. For each gap size, the distances around the tank which have that gap size would need to be accumulated. Gaps would be measured with a probe having a diameter equivalent to one of the gap widths specified in the standard. In the process of measuring gaps, those gap widths which are between two sizes specified in the standards would be considered equivalent to the larger of the two sizes. For example, a gap between 0.32 cm (⅛ in.) and 1.3 cm (½ in.) in width would be considered as 1.3 cm (½ in.).

Most of the monitoring and recordkeeping requirements in the proposed standards (sections 60.115a (a), (b), (c), and (d)) are the same as the ones in the current standards. An additional requirement is proposed to allow for routine inspection of the primary seal between performance tests. Under this requirement the secondary seal would allow easy insertion of probes in at least four locations for measuring gaps in the primary seal. This would allow for inspection of the primary seal without removing the secondary seal which would make emptying the tank unnecessary. The tank, therefore, would have to be emptied only during performance tests and routine maintenance of the secondary seal.

MISCELLANEOUS

In accordance with section 117 of the Act, publication of these proposed standards was preceded by consultation with independent experts and Federal departments and agencies. The Administrator will welcome comments on all aspects of the proposed regulation, including economic and technological issues and record keeping requirements.

It should be noted that standards of performance for new sources established under section 111 of the Clean Air Act reflect the degree of emission limitation achievable through application of the best adequately demonstrated technological system of continuous emission reduction (taking into consideration the cost of achieving such emission reduction, any nonair quality health and environmental impact and energy requirements). State implementation plans (SIPs) approved or promulgated under section 110 of the Act, on the other hand, must provide for the attainment and maintenance of national ambient air quality standards (NAAQS) designed to protect public health and welfare. For that purpose, SIPs must in some cases require greater emission reductions than those required by standards of performance for new sources. Section 173 of the Act requires, among other things, that a new or modified source constructed in an area which exceeds the NAAQS must reduce emissions to the level which reflects the "lowest achievable emission rate" for such category of source, as defined in section 171(3). In no event can the emission rate exceed any applicable standard of performance.

A similar situation may arise when a major emitting facility is to be constructed in a geographic area which falls under the prevention of significant deterioration of air quality provi-

sions of the Act (Part C). These provisions require, among other things, that major emitting facilities to be constructed in such areas are to be subject to best available control technology for all pollutants regulated under the Act. The term "best available control technology" (BACT), as defined in section 169(3), means "an emission limitation based on the maximum degree of reduction of each pollutant subject to regulation under this Act emitted from or which results from any major emitting facility, which the permitting authority, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such facility through application of production processes and available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of each such pollutant. In no event shall application of 'best available control technology' result in emissions of any pollutants which will exceed the emissions allowed by any applicable standard established pursuant to section 111 or 112 of this Act."

Standards of performance should not be viewed as the ultimate in achievable emission control and should not preclude the imposition of a more stringent emission standard, where appropriate. For example, while cost of achievement may be an important factor in determining standards of performance applicable to all areas of the country (clean as well as dirty), costs must be accorded far less weight in determining the "lowest achievable emission rate" for new or modified sources locating in areas violating statutorily-mandated health and welfare standards. Although there may be emission control technology available that can reduce emissions below those levels required to comply with standards of performance, this technology might not be selected as the basis of standards of performance due to costs associated with its use. This in no way should preclude its use in situations where cost is a lesser consideration, such as determination of the "lowest achievable emission rate."

In addition, States are free under section 116 of the Act to establish even more stringent emission limits than those established under section 111 or those necessary to attain or maintain the NAAQS under section 110. Thus, new sources may in some cases be subject to limitations more stringent than standards of performance under section 111, and prospective owners and operators of new sources should be aware of this possibility in planning for such facilities.

Economic impact assessment: An economic impact assessment has been prepared as required under section 317 of the Act and is included in the docket.

Dated: May 2, 1978.

DOUGLAS M. COSTLE,
Administrator.

REFERENCES

(1) "Evaporation Loss from Floating Roof Tanks," American Petroleum Institute Bulletin 2517, February 1962.
(2) "Control of Hydrocarbon Emissions from Petroleum Liquids," EPA-600/2-75-042, September 1975.
(3) "Control of Volatile Organic Emissions from Existing Stationary Sources—Volume I: Control Methods for Surface—Coating Operations," EPA-450/2-76-028, November 1976.
(4) "Economic Impact of EPA's Regulations on the Petroleum Refining Industry," EPA-230/13-76-004, Part II, Section E, p. II-4.
(5) "SOHIO/CBI Floating Roof Emission Test Programs," Final Report, Chicago Bridge & Iron Co., November 18, 1976.
(6) "SOHIO/CBI floating roof Emission Test Program," Supplemental Report, Chicago Bridge & Iron Co., February 15, 1977.
(7) "Western Oil and Gas Association Metallic Sealing Ring Emission Test Program," Interim Report, Chicago Bridge & Iron, January 18, 1977.
(8) Ball, D. A., Putman, A. A., and Luce, R. G., "Evaluation of Methods for Measuring and Controlling Hydrocarbon Emissions from Petroleum Storage Tanks," U.S. EPA-450/13-76-036, November 1976.
(9) "Hydrocarbon Emissions From Floating Roof Storage Tanks," Prepared for the Western Oil & Gas Association by Engineering-Science, Inc., January 1977.
(10) Western Oil and Gas Association Metallic Sealing Ring Emission Test Program, Supplemental Report, Chicago Bridge & Iron, June 30, 1977.
(11) Letter, from Royce J. Laverman to Mr. R. K. Burr, October 11, 1977.
(12) "Financial and Economic Impacts of Proposed Standards of Performance for New Sources—Storage Vessels for Petroleum Agency," Draft Report, Energy and Environmental Analysis, Inc., August 1977.

It is proposed that 40 CFR Part 60 be amended by revising § 60.11(a) of Subpart A, by revising the heading and amending §§ 60.110 and 60.111 of Subpart K, and by adding a new Subpart Ka as follows:

1. § 60.11(a) is revised to read as follows:

§ 60.11 Compliance with standards and maintenance requirements.

(a) Compliance with standards in this part, other than opacity standards, shall be determined only by performance tests established by § 60.8, unless otherwise specified in the applicable standard.

2. The heading for Subpart K is revised to read as follows:

Subpart K—Standards of Performance for Storage Vessels for Petroleum Liquids Constructed Prior to (Date of Proposal of These Standards)

3. Paragraphs (c)(1) and (c)(2) of § 60.110 are revised to read as follows:

§ 60.110 Applicability and designation of affected facility.

* * * * * *

(c) * * *

(1) Has a capacity greater than 151,416 liters (40,000 gallons), but not exceeding 246,052 liters (65,000 gallons), and commences construction or modification after March 8, 1974, and prior to (date of proposal of these standards).

(2) Has a capacity greater than 246,052 liters (65,000 gallons) and commences construction or modification after June 11, 1973, and prior to (date of proposal of these standards).

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4. Paragraph (c) of § 60.111 is revised to read as follows:

§ 60.111 Definitions.

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(c) "Petroleum refinery" means any facility engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricant, or other products through distillation of petroleum or through redistillation, cracking, extracting, or reforming of unfinished petroleum derivatives.

5. A new Subpart Ka is added to read as follows:

Subpart Ka—Standards of Performance for Storage Vessels for Petroleum Liquids Constructed on or After (Date of Proposal of These Standards)

Sec.
60.110a Applicability and designation of affected facility.
60.111a Definitions.
60.112a Standard for hydrocarbons.
60.113a Equivalent equipment.
60.114a Testing and procedures.
60.115a Monitoring of operations.

AUTHORITY: Sec. 111, 301(a) of the Clean Air Act as amended (42 U.S.C. 7411, 7601(a)), and additional authority as noted below.

§ 60.110a Applicability and designation of affected facility.

(a) The affected facility to which this subpart applies is each storage vessel for petroleum liquids which has a storage capacity greater than 151,416 liters (40,000 gallons) and for which construction is commenced after (date of proposal of these standards).

§ 60.111a Definitions.

As used in this subpart, all terms not defined herein shall have the meaning given them in the Act and in Subpart A of this part.

(a) "Storage vessel" means any tank, reservoir, or container used for the storage of petroleum liquids, but does not include:

(1) Pressure vessels which are designed to operate in excess of

0.0044kg/m² (15 lb/in.² gauge) without emissions to the atmosphere except under emergency conditions,

(2) Subsurface caverns or porous rock reservoirs, or

(3) Underground tanks if the total volume of petroleum liquids added to and taken from a tank annually does not exceed twice the volume of the tank.

(b) "Petroleum liquids" means petroleum, condensate, and any finished or intermediate products manufactured in a petroleum refinery but does not mean Nos. 2 through 6 fuel oils as specified in A.S.T.M. D396-69, gas turbine fuel oils Nos. 2-GT through 4-GT as specified in A.S.T.M. D2880-71, or diesel fuel oils Nos. 2-D and 4-D as specified in A.S.T.M. D975-68.

(c) "Petroleum refinery" means any facility engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants, or other products through distillation of petroleum or through redistillation, cracking, extracting, or reforming of unfinished petroleum derivatives.

(d) "Petroleum" means the crude oil removed from the earth and the oils derived from tar sands, shale, and coal.

(e) "Hydrocarbon" means any organic compound consisting predominantly of carbon and hydrogen.

(f) "Condensate" means hydrocarbon liquid separated from natural gas which condenses due to changes in the temperature and/or pressure and remains liquid at standard conditions.

(g) "True vapor pressure" means the equilibrium partial pressure exerted by a petroleum liquid as determined in accordance with methods described in American Petroleum Institute Bulletin 2517, Evaporation Loss from Floating Roof Tanks, 1962.

(h) "Reid vapor pressure" is the absolute vapor pressure of volatile crude oil and volatile non-viscous petroleum liquids, except liquified petroleum gases, as determined by ASTM-D-323-58 (reapproved 1968).

§ 60.112a Standard for hydrocarbons.

(a) The owner or operator of any storage vessel which contains a petroleum liquid which, as stored, has a true vapor pressure equal to or greater than 78 mm Hg (1.5 psia) but not greater than 570 mm Hg (11.1 psia), shall equip the storage vessel with one of the following:

(1) An external floating roof, consisting of a pontoon-type or double-deck-type cover that rests on the surface of the liquid contents and is equipped with a closure device between the tank wall and roof edge. Except during initial tank fill, performance tests, or when the tank is completely emptied, the roof is to be floating on the liquid, i.e. off the roof leg supports, at all times. The closure device is to consist of two seals, one above the other. The lower seal is referred to as the primary seal and the upper seal is referred to as the secondary seal.

(i) The primary seal is to be a metallic shoe seal or equivalent as provided in § 60.113a(b), and is to meet the following requirements:

(A) Gaps between the tank wall and the primary seal are not to exceed 0.32 cm (⅛ in.) in width for a cumulative length of 60 percent of the circumference of the tank, are not to exceed 1.3 cm (½ in.) in width for a cumulative length of the next 30 percent of the circumference of the tank, and are not to exceed 3.8 cm (1½ in.) in width for a cumulative length of the remaining 10 percent of the circumference of the tank. No gap between the tank wall and the primary seal shall exceed 3.8 cm (1½ in.). No continuous gap greater than 0.32 cm (⅛ in.) shall exceed 10 percent of the circumference of the tank.

(B) One end of the shoe seal is to extend into the stored liquid and the other end is to extend a minimum vertical distance of 61 cm (24 in.) above the stored liquid surface.

(C) There are to be no holes, tears, or other openings in the shoe or seal fabric.

(ii) The secondary seal is to meet the following requirements:

(A) Gaps between the tank wall and the secondary seal are not to exceed 0.32 cm (⅛ in.) in width for a cumulative length of 95 percent of the circumference of the tank, and are not to exceed 1.3 cm (½ in.) in width for a cumulative length of the remaining 5 percent of the circumference of the tank. No gap between the tank wall and the secondary seal shall exceed 1.3 cm (½ in.).

(B) The secondary seal is to be installed above the primary seal so that the space between the roof edge and tank wall is completely covered, except as provided in paragraph (a)(1)(ii)(A) of this section.

(C) There are to be no holes, tears, or other openings in the seal or in any seal fabric.

(iii) All openings in the roof except for automatic bleeder vents and rim space vents are to provide a projection below the liquid surface and are to be equipped with a cover, seal, or lid. The cover, seal, or lid is to be in a closed (i.e. no visible gap) position at all times except when the device is in actual use. Automatic bleeder vents are to be closed at all times except whe the roof is floated off or landed on the roof leg supports and rim vents are to be set to open only when the roof is being floated off the roof leg supports.

(iv) Any emergency roof drain is to be provided with a slotted membrane fabric cover that covers at least 90 percent of the area of the opening, or equivalent as provided in § 61.113a.

(2) A fixed roof container with an internal-floating-type cover which is equipped with a closure seal between the tank wall and roof edge. All openings, except stub drains, are to be equipped with a cover, seal, or lid. The cover, seal, or lid is to be in a closed position at all times except when the device is in actual use. Automatic bleeder vents are to be closed at all times except when the roof is floated off or landed on the roof leg supports. Rim vents, if provided, are to be set to open when the roof is being floated off the roof leg supports or at the manufacturer's recommended setting.

(3) A vapor recovery system, capable of collecting all hydrocarbon vapors and gases discharged from the storage vessel, and a vapor disposal system capable of processing such hydrocarbon vapors and gases so as to prevent their emission to the atmosphere.

(4) A system equivalent to those described in paragraphs (a)(1), (a)(2), or (a)(3), as provided in § 61.113a.

(b) The owner or operator of any storage vessel which contains a petroleum liquid which, as stored, has a true vapor pressure greater than 570 mm Hg (11.1 psia), shall equip the storage vessel with:

(1) A vapor recovery system, capable of collecting all organic vapors and gases discharged, and a vapor return or disposal system capable of processing such hydrocarbon vapors and gases so as to prevent their emission to the atmosphere; or

(2) Equivalent as provided in § 60.113a.

§ 61.113a Equivalent equipment.

(a) Upon written application from an owner or operator, the Administrator may approve use of equipment which has been demonstrated to his satisfaction to be equivalent in terms of reducing hydrocarbon emissions to the atmosphere to that prescribed for compliance with a specific paragraph of this subpart.

(b) A nonmetallic resilient seal is approved as equivalent to the shoe seal required by § 61.112a(a)(1)(i) if the gaps between the tank wall and the primary seal do not exceed 0.32 cm (⅛ in.) in width for a cumulative length of 95 percent of the circumference of the tank and do not exceed 1.3 cm (½ in.) in width for a cumulative length of the remaining 5 percent of the circumference of the tank and the gaps between the tank wall and the secondary seal used above the nonmetallic resilient seal do not exceed 0.32 cm (⅛ in.) over the entire circumference of the tank.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414).)

§ 60.114a Testing and procedures.

(a) Except as provided in § 60.8(b), compliance with the standard pre-

scribed in § 60.112(a) shall be determined as follows:

(1) The owner or operator of any storage vessel subject to this Subpart which has an external floating roof shall meet the following requirements:

(i) Determine the gap widths between the primary seal and the tank wall and the secondary seal and the tank wall, and furnish the Administrator with a written report of the results. This shall de done either before, or within 60 days after, the storage vessel is initially filled with petroleum liquid, at least once every five years thereafter, and at other times as may be required by the Administrator under section 114 of the Act. The gap widths shall be determined according to the following procedures:

(A) Measure the gaps at various roof levels, including the lowest level of the roof legs, the maximum roof height, and six approximately equidistant points between these two levels.

(B) Measure the gaps continuously around the circumference of the tank and determine the accumulated distance for each gap width.

(C) Measure the gaps with probes of diameter equal to each gap width specified in §§ 60.112a(a)(1) (i)(A) and (ii)(A). A gap is deemed to exist under the following conditions:

(*1*) For a primary seal, the probe is to touch the liquid surface without forcing, and

(*2*) For a secondary seal, the probe is to touch the primary seal without forcing.

(D) Tabulate the gap widths: gaps less than or equal to 0.32 cm (⅛ in.) are to be considered equivalent to 0.32 cm (⅛ in.), gaps greater than 0.32 cm (⅛ in.) but less than or equal to 1.3 cm. (½ in.) are to be considered to be equivalent to 1.3 cm (½ in.), and gaps greater than 1.3 cm (½ in.) but less than or equal to 3.8 cm (1½ in.) are to be considered equivalent to 3.8 cm (1½ in.).

(ii) Provide the Administrator 30 days prior notice of the gap measurement to afford the Administrator the opportunity to have an observer present.

[Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414)].

§ 60.115a. Monitoring of operations.

(a) The owner or operator of any storage vessel to which this subpart applies shall for each storage vessel maintain a file of each type of petroleum liquid stored, of the typical Reid vapor pressure of each type of petroleum liquid stored, and of the dates of storage. Dates on which the storage vessel is empty shall be shown.

(b) The owner or operator of any storage vessel to which this subpart applies shall for each storage vessel determine and record the average monthly storage temperature and true vapor pressure of the petroleum liquid stored at such temperature if:

(1) The petroleum liquid has a true vapor pressure, as stored, greater than 26 mm Hg (0.5 psia) but less than 78 mm Hg (1.5 psia) and is stored in a storage vessel other than one equipped with an external floating roof, an interval-floating-type cover, a vapor recovery system or their equivalents; or

(2) The petroleum liquid has a true vapor pressure, as stored, greater than 470 mm Hg (9.1 psia) and is stored in a storage vessel other than one equipped with a vapor recovery system or its equivalent.

(c) The average monthly storage temperature is an arithmetic average calculated for each calendar month, or portion thereof if storage is for less than a month, from bulk liquid storage temperatures determined at least once every 7 days.

(d) The true vapor pressure is to be determined by the procedure in API Bulletin 2517. This procedure is dependent upon determination of the storage temperature and the Reid vapor pressure, which requires sampling of the petroleum liquids in the storage vessels. Unless the Administrator requires in specific cases that the stored petroleum liquid be sampled, the true vapor pressure may be determined by using the average monthly storage temperature and the typical Reid vapor pressure. For those liquids for which certified specifications limiting the Reid vapor pressure exist, that Reid vapor pressure may be used. For other liquids, supporting analytical data must be made available on request to the Administrator when typical Reid vapor pressure is used.

(e) In order that the primary seal may be routinely inspected, the secondary seal is to allow easy insertion of probes up to 3.8 cm (1½ in.) in diameter in at least four locations to measure gaps in the primary seal oh storage vessels equipped with external floating roofs.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414)).

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[6560-01]

[40 CFR Part 60]

[FRL 895-4]

STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

Public Hearing on Proposed Standards for Petroleum Liquid Storage Vessels

AGENCY: Environmental Protection Agency.

ACTION: Hearing on proposed rule.

SUMMARY: This document announces a public hearing on the standards of performance for petroleum liquid storage vessels which are proposed in this issue of the FEDERAL REGISTER.

DATES: Hearing Date: Wednesday, June 7, 1978. See *Supplementary Information* for additional information.

ADDRESSES: Hearing held: Room 3906, Waterside Mall, 401 M Street SW., Washington, D.C. See *Supplementary Information* for additional information.

FOR FURTHER INFORMATION CONTACT:

Mr. Don R. Goodwin, Director, Emission Standards and Engineering Division (MD-13), Environmental Protection Agency, Research Triangle Park, N.C. 27711, telephone 919-541-5271.

SUPPLEMENTARY INFORMATION: In accordance with section 307(d)(5) of the Clean Air Act, a public hearing on the standards of performance for petroleum liquid storage vessels which are proposed in this issue of the FEDERAL REGISTER will be held as follows:

DATE: Wednesday, June 7, 1978.

PLACE: Room 3906, Waterside Mall, 401 M Street SW., Washington, D.C.

TIME: 9:00 a.m.

PURPOSE: Interested persons will be provided the opportunity for oral presentation of data, views, or arguments concerning the proposed standards of performance for petroleum liquid storage vessels. The hearing is open to the public.

Persons wishing to make oral presentations, which will be limited to 15 minutes each, or to attend the hearing should notify EPA by May 31 by contacting Ms. Mary Jane Clark, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, N.C. 27711, telephone 919-541-5271. Any member of the public may file a written statement with EPA before, during, or within 30 days after the hearing. Written statements should be addressed to Mr. Jack R. Farmer at the address above.

A verbatim transcript of the hearing and written statements will be available for public inspection and copying during normal working hours at the U.S. Environmental Protection Agency's Public Information Reference Unit, Room 2922, Waterside Mall, 401 M Street SW., Washington, D.C. 20460 (Docket Number OAQPS-78-2).

Dated: May 9, 1978.

EDWARD F. TUERK,
Acting Assistant Administrator for Air and Waste Management.

[FR Doc. 78-13014 Filed 5-17-78; 8:45 am]